

## Section 2.1- Scatterplots

### Scatterplots

#### Notes:

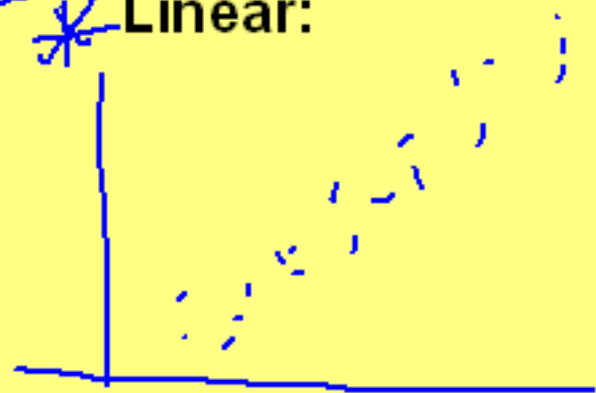
- Shows the relationship between 2 quantitative variables
- Can show categorical variables by colors/shapes  
\* only one
- Individuals are represented by the dots on the plot  
\* duplicate obs.?
- Explanatory Variable:
  - On the X axis  
Ex: SATM  
SATV
  - Explains or causes the change in the y variable  
Ex: amt. meds  
# tumors
- Response Variable:
  - On the y axis  
Ex: # hrs, studying - x  
grade on exam - y
  - Measures the outcome of an experiment or study

# Interpreting Scatterplots:

## Overall pattern

- Get a sense of what the data/plot looks like in general, then comment on the following 3 things

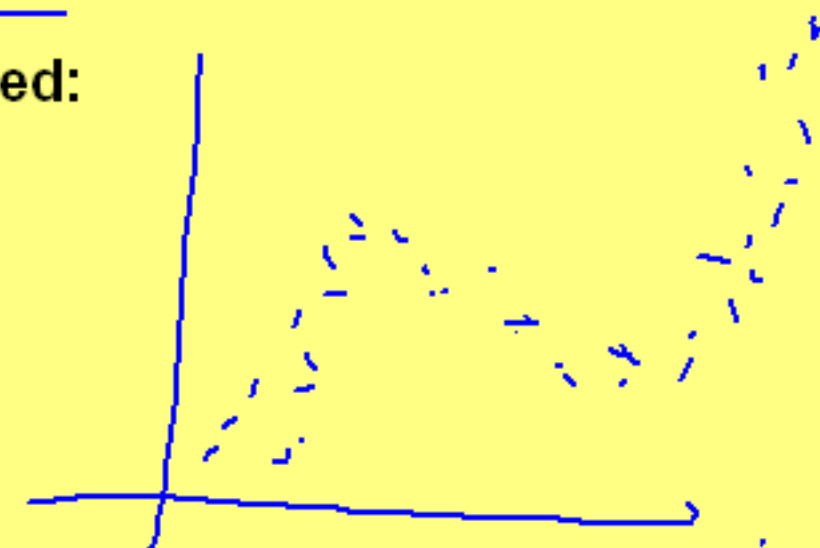
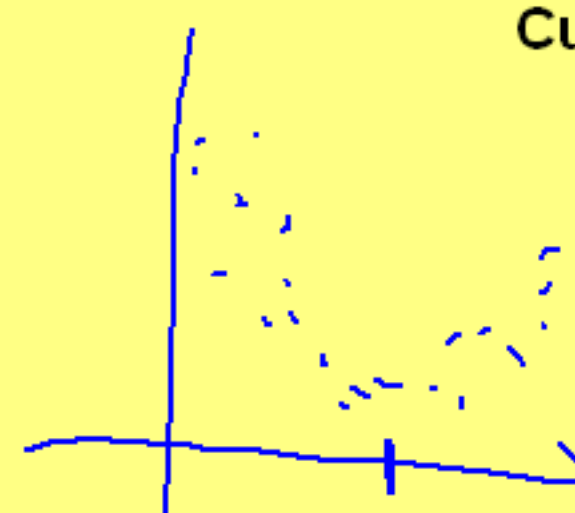
(1) Form  
\* Linear:



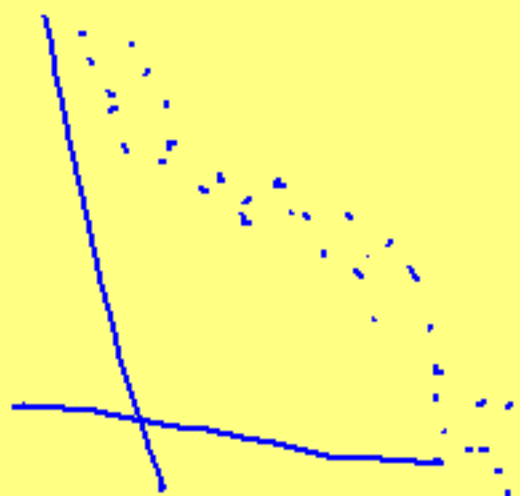
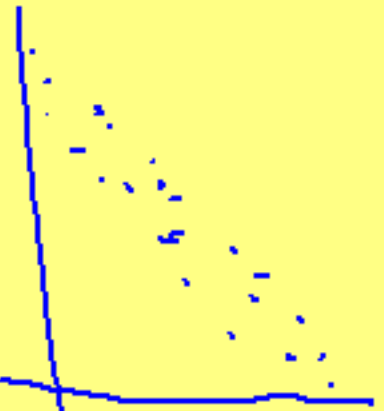
Scattered



Curved:



(2) Direction  
Negative Association



Positive Association

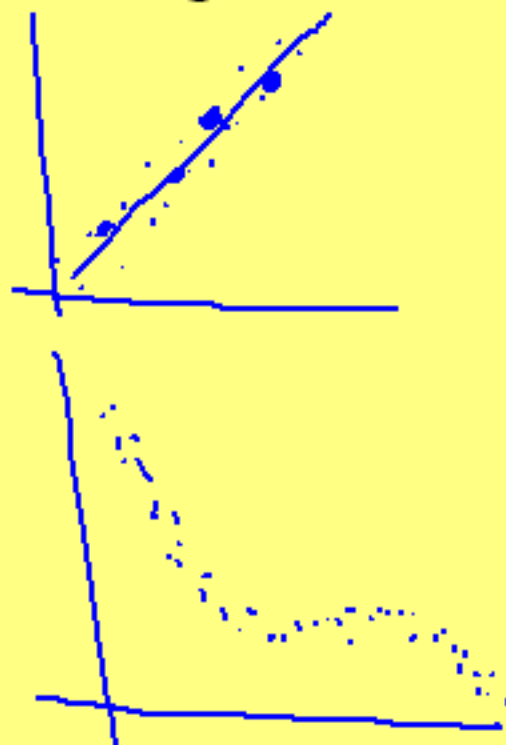


(1) Strength-

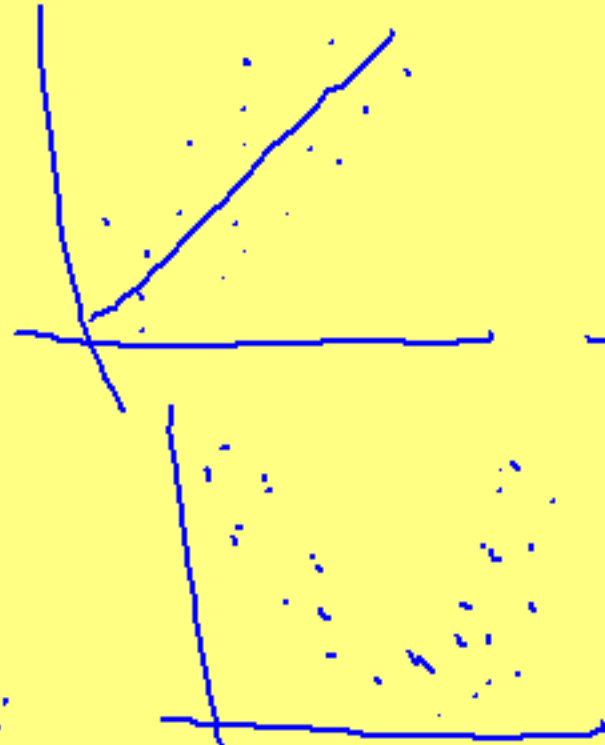
- how closely the pts. follow a form
  - Use the following words (or combinations of these):
    - weak
    - moderate
    - strong
    - scattered
- moderately weak  
" strong

Examples:

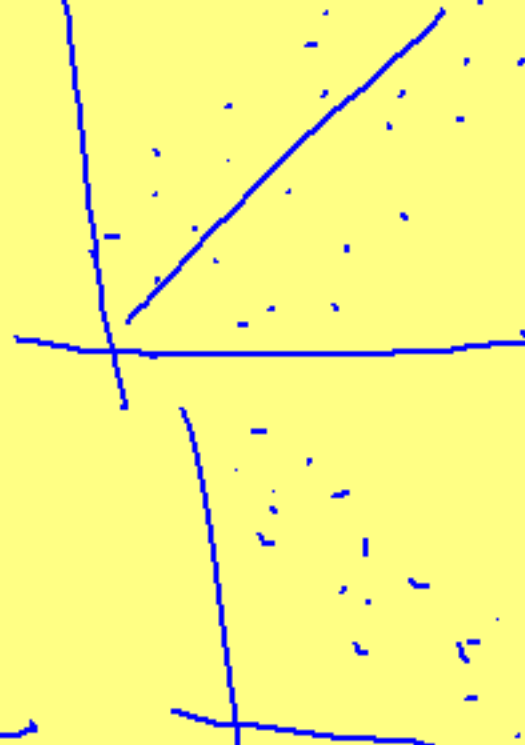
Strong



Moderate



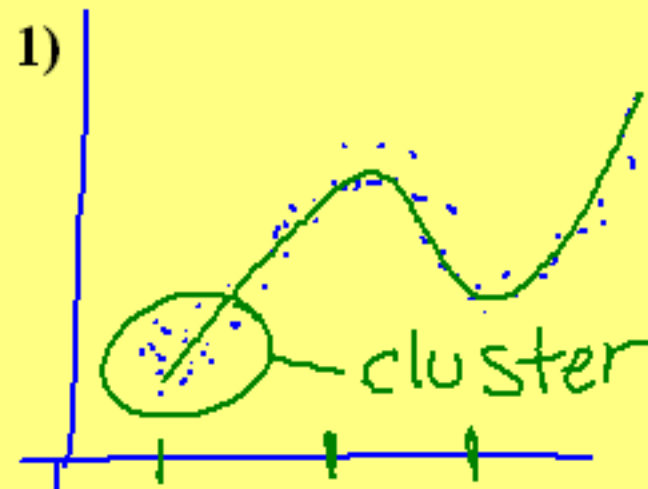
Weak



Scattered



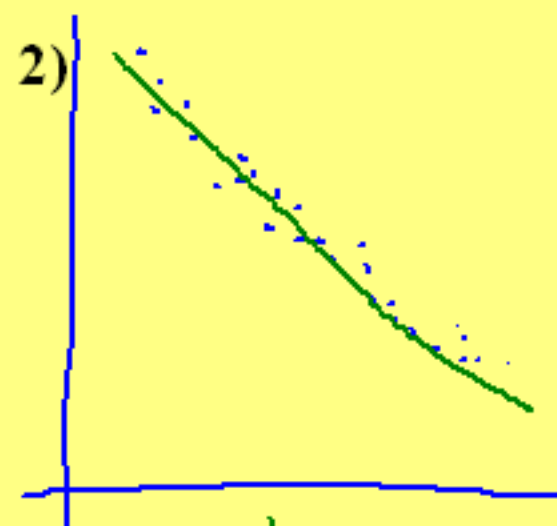
## Examples: Describing Scatterplots



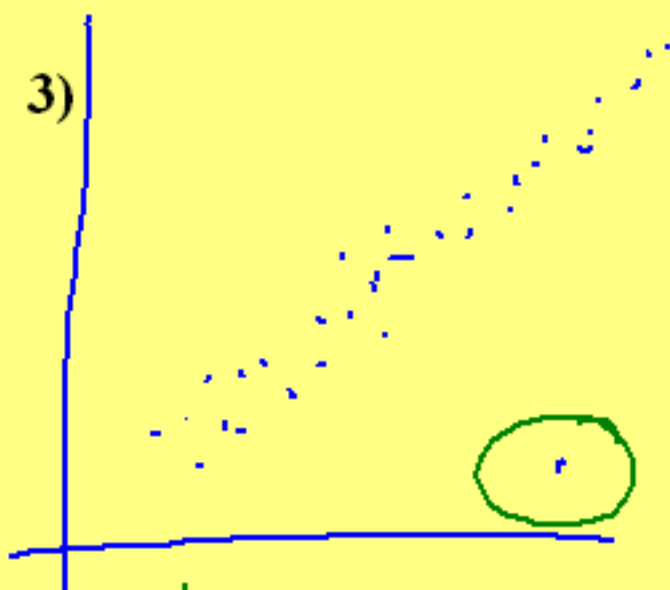
- curved
- positive
- strong/mod. strong

\* You try the next 4 examples

\* Now complete worksheet 2.1



- linear
- negative
- strong



- linear
- pos.
- mod/mod. strong
- outlier @ ( , )

## Worksheet 2.1- ANSWERS

① Chart:

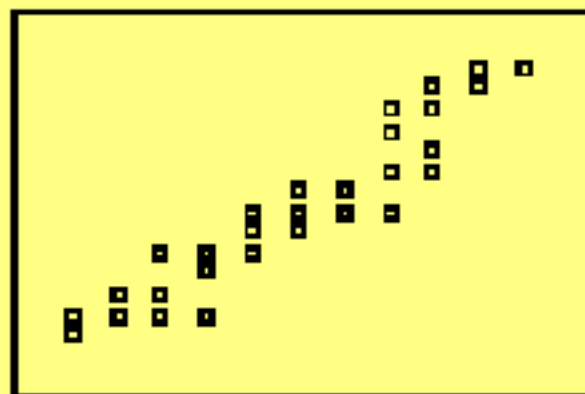
	Strong	Mod	Weak
-	C	D	F
+	E	A	B

- ②
- |                   |                   |
|-------------------|-------------------|
| a) +, strong      | f) -, mod.        |
| b) +, mod. strong | g) +, strong      |
| c) Scattered      | h) +, mod. strong |
| d) +, mod.        |                   |
| e) -, strong      |                   |

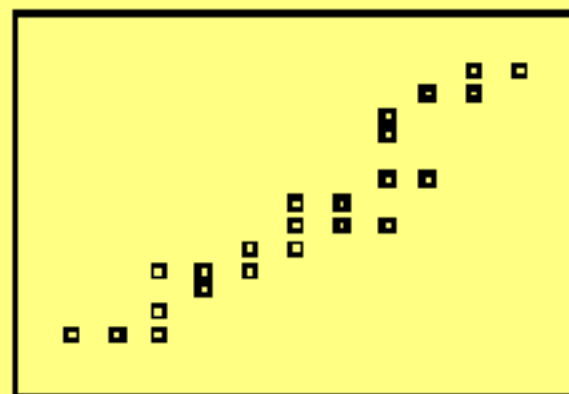
## Section 2.2- Correlation

WHAT PLOT HAS THE STRONGER RELATIONSHIP? BY HOW MUCH??

A



B



# = strength

Correlation:

Symbol: **r**

(sample)

Definition: **measure the direction and strength of the linear relationship between X and Y variables.**

##

Formula:

$$r = \frac{1}{n-1} \sum \left( \frac{x_i - \bar{x}}{s_x} \right) \left( \frac{y_i - \bar{y}}{s_y} \right) = \text{corr}$$

Z-score

- Grouping/ Ungrouping
- How to make scatterplots on the calculator
- Deleting a point from a list
- Using the program CORR

## UNGROUPING:

- go to 2nd MEM (the + sign)
- go down to GROUP, hit ENTER
- go over to UNGROUP
- select the group you want
- hit ENTER- the lists come up

## SCATTERPLOTS

- go to STATPLOT (2nd, then Y=)
- go into plot 1, turn it on, and select a scatterplot (the 1st type)
- put your x-list and y-list in
- hit ZOOM 9 (zoom stat)
- hit trace to trace the points.

## TO FIND THE CORRELATION:

- go to PRGM
- go to the program CORR and hit ENTER
- then hit ENTER again
- it prompts you for the x-list- find the x-list in your menu of lists
- hit ENTER
- do the same for your y-list
- hit ENTER
- the correlation is "r"



**CORRELATION COEFFICIENT: the last few notes....**

## COEFFICIENT OF DETERMINATION:

What is it?

How do we interpret it?